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09/807,655	04/16/2001	Dharshini Chryshantha Fongalland	JMYT-236US	2279

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EXAMINER

BOYD, JENNIFER A

ART UNIT

PAPER NUMBER

1771

DATE MAILED: 12/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/807,655

Applicant(s)

FONGALLAND ET AL.

Examiner

Jennifer A Boyd

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Response to Amendment***

1. Pre-Amendment A, filed on April 16, 2001 as Paper No. 3, has been entered.

***Abstract***

2. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6, 7, 8 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 6, 7 and 8 use the term "w/w". Please clarify what "w/w" means in each of the claims.

6. Claim 23 recites the limitation "said mixed amorphous silica fibers" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1771

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-10, 13, 15, 16, 19, 20 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuntzburger et al. (US 5,547,550).

As to claims 1, 13, 15, 19 and 20, Kuntzburger et al. teaches a diaphragm for use in aqueous alkaline halide solutions electrolysis cells (Abstract). The microporous diaphragm created by depositing a suspension containing 100 parts by dry weight of asbestos fibers, 30 to 60 parts dry weight of silica-based derivatives and 20 to 60 parts by weight of fluorinated polymer (column 3, lines 50 – 55). It is irrelevant whether the silica and fluorinated polymer is seen as a binder because the presence of a silica-based derivative and fluorinated polymer in the diaphragm is expected to exhibit the same properties.

As to claim 2, Kuntzburger et al. teaches the silica-based derivative is in granular form (column 5, lines 34 – 37) and made into solution (column 1, lines 65 – 67).

As to claims 3 and 4, Kuntzburger et al. teaches that the fluorinated hydrocarbon polymer comprises one of more non-ion conducting polymers such as polytetrafluoroethylene (PTFE) (column 5, lines 30 – 31).

As to claim 5, Kuntzburger et al. teaches that the polymer comprises polytetrafluoroethylene (PTFE) (column 5, lines 30 – 31) and the silica is granular in form (column 5, lines 34 – 37) and made into solution (column 1, lines 65 – 67) therefore colloidal.

As to claims 6, 7 and 8, Kuntzburger et al. teaches the silica-based derivative comprises 30 to 60 parts of the dry weight and the fluorinated polymer comprises 20 to 60 parts of the dry

Art Unit: 1771

weight (column 3, lines 50 – 55). Therefore, the dry solid weight percentage ratio range is 75:25 to  $33\frac{1}{3}:66\frac{2}{3}$  silica to fluorinated polymer meeting the required range of 95:5 to 5:95 of claim 6, range of 70:30 to 30:70 of claim 7 and 50:50 of claim 8.

As to claim 9, Kuntzburger et al. teaches the fluorinated polymer and silica-based derivative is made into an aqueous suspension (column 3, lines 49 – 60).

As to claim 10, Kuntzburger et al. teaches the suspension contains 100 parts by dry weight of asbestos fibers, 30 to 60 parts dry weight of silica-based derivatives and 20 to 60 parts by weight of fluorinated polymer (column 3, lines 50 – 55). The suspension contains 500 to 10,000 parts water per 100 parts asbestos fibers (column 5, lines 44 – 46). Therefore, the suspension contains 50 to 120 parts solids (dry weight of silica-based derivatives and fluorinated polymer) per 500 to 10,000 parts water. For example, if the suspension contained 30 parts by weight silica-based derivatives, 20 parts by weight fluorinated polymer and 500 parts by weight water, the suspension would have about 10% solids by weight.

As to claim 16, Kuntzburger et al. teaches the process of manufacturing the substrate by preparing an aqueous suspension including asbestos fibers, depositing the suspension through a porous material, eliminating the liquid medium and drying the coating formed, sintering the coating. The silica-based derivatives and fluorinated polymer are added before the described step c in claim 16 when the asbestos fibers are added to the aqueous suspension (column 3, lines 47 – 65).

As to claim 23, Kuntzburger et al. teaches that the substrate is made by depositing a suspension composing silica-based derivatives, a fluorinated polymer and asbestos fibers. By

Art Unit: 1771

depositing through a porous material, the end product would comprise randomly oriented particles.

***Claim Rejections - 35 USC § 102/103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 14, 21 and 22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kuntzburger (US 5,547,550).

Although Kuntzburger does not explicitly teach the claimed  $\pm 16\%$  change in area as required by claim 14,  $\pm 10\%$  change in area as required by claim 21 and 0 to 6% expansion in area as required by claim 22 of the membrane when dried then boiled, it is reasonable to presume that the shrinkage in area is inherent to Kuntzburger. Support for said presumption is found in the use of like materials and similar construction (i.e. a porous membrane comprising PTFE and a colloidal silica which is created by depositing suspension and drying), which would result in the claimed property. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, these claimed properties would obviously have been provided once the Kuntzburger product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to providing of this rejection made above under 35 USC 102. In the present invention, one would have been motivated to have a membrane which undergoes  $\pm 16\%$  change in its area when dried then boiled in water because shrinkage or expansion is typical in such a membrane.

***Claim Rejections - 35 USC § 103***

11. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuntzburger et al. (US 5,547,550) in view of Bachot et al. (US 4,743,349).

Kuntzburger teaches the use of asbestos fibers in the membrane (Abstract).

Kuntzburger fails to disclose that glass fibers can be used instead of asbestos fibers with a diameter in the range of 0.1 $\mu$ m - 50 $\mu$ m.

Bachot teaches a bonded coherent fibrous web substrates well adopted as cathodic elements for electrolytic cells (Abstract). The fibrous web is bonded together with a fluorine-containing polymer. Bachot suggests that non-conductive fibers may be used such as glass or asbestos fibers (column 2, lines 45 – 51). These non-conductive fibers have diameters ranging from about 0.1 $\mu$ m – 100  $\mu$ m ( $10^{-5}$  mm to 0.1 mm) (claim 4).

Given the demonstrated equivalence of glass and asbestos fibers in this utility, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use glass fibers with diameters ranging between 0.1 $\mu$ m – 50  $\mu$ m as suggested by Bachot in the membrane of Kuntzberger motivated by the desire to use a less hazardous material than asbestos and gaining the mechanical benefits of strength and durability provided by the glass. It should be noted that glass fibers with small diameters provide a flexible membrane.

12. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuntzburger et al. (US 5,547,550) in view of Denton et al. (US 6,042,958).

Kuntzburger et al. teaches the process of manufacturing the substrate by preparing an aqueous suspension including asbestos fibers, depositing the suspension through a porous

material, eliminating the liquid medium and drying the coating formed, sintering the coating (column 3, lines 47 – 65).

Kuntzburger et al. fails to disclose a further step of impregnating the fiber substrate with an ion-conducting polymeric material by nip roller coating.

Denton et al. teaches a membrane for use in electrochemical cells (Abstract). The membrane is made from a process based on paper-making technology (column 6, lines 13 – 38). In the membrane making process, the fibers are dispersed in water to form a dilute slurry. The slurry can contain PTFE coated fibers and particulate silica (column 5, lines 18 – 51). The slurry is deposited onto moving mesh bed, dried and then compacted. Afterwards, the membrane is coated and filled with a polymeric material by means of a nip roller. The coating may be an ion-conducting material (column 3, lines 63 – 67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an additional step of a nip roller coating the substrate with an ion-conducting polymeric material as suggested by Denton in order to obtain additional surface characteristics. It should be noted by coating the fibers with an ion-exchange polymeric materials, the water transport properties of the membrane are enhanced (column 5, lines 18 – 39). It is desirable to coat using nip rollers which provides an evenly impregnated membrane.




Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 703-305-7082. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 703-308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer Boyd  
November 26, 2002



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